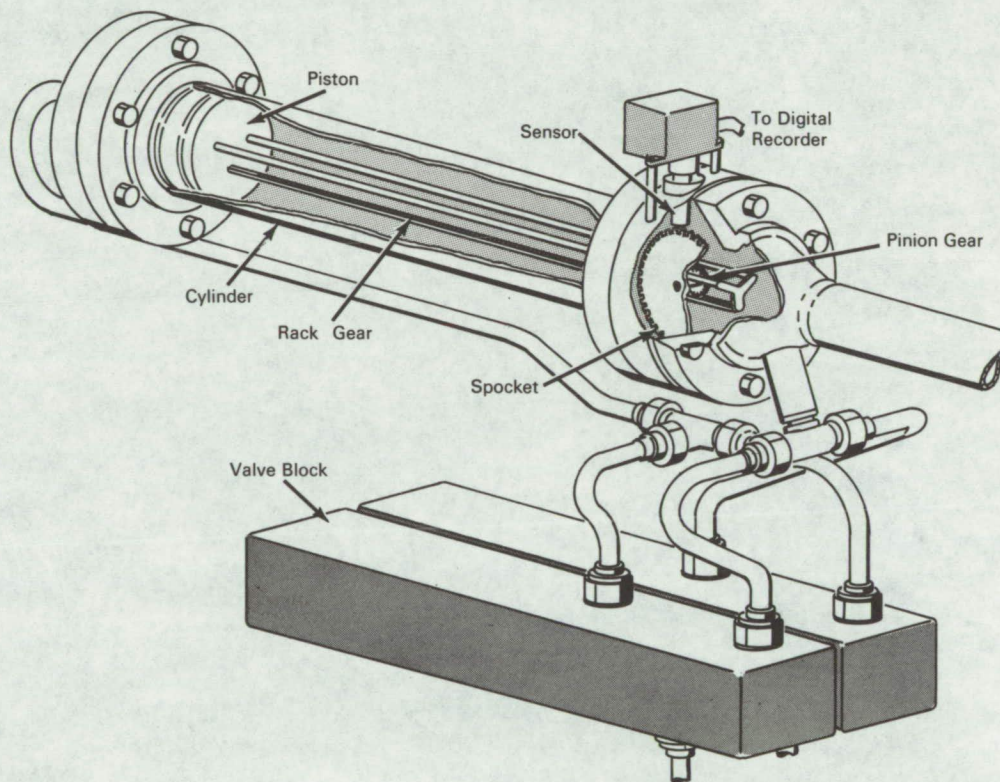


NASA TECH BRIEF



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Positive Displacement Cylinder Measures Corrosive Liquid Volume



The problem:

To accurately measure volumetric flow rates of corrosive liquids. Such measurement has, in the past, been accomplished by a turbine flowmeter that cannot sense low flow rates and can only achieve a 0.5% accuracy.

The solution:

A positive displacement cylinder that is compatible with corrosive liquids and that handles flow rates

from zero to 75 gpm at pressures to 900 psig with an accuracy of 0.25%.

How it's done:

A free floating piston within a cylinder is moved by liquid flowing through the device. The piston is attached to a rack gear that drives a pinion gear in response to the piston's motion. A sprocket, that is part of the gear train, rotates beneath a sensing device that is actuated by a proximity switch in contact with the sprocket teeth. Each sprocket tooth trips

(continued overleaf)

the switch as it passes and produces a pulse in the sensing device (400 pulses equal one gallon of liquid acting upon the piston). These pulses are totalized continuously and transmitted to a digital recorder.

As the free piston reaches an end of the cylinder, a microswitch actuates a valve arrangement that reverses the direction of liquid flow within the cylinder to move the piston and attached rack gear in the opposite direction to continue the sprocket tooth totalization count indefinitely.

Notes:

1. This device could be used for accurate batch mixing of a variety of liquids (other than cryogenic) that impose severe environmental compatibility problems in their handling.

2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
Houston, Texas 77058
Reference: B66-10589

Patent status:

No patent action is contemplated by NASA.

Source: Charles J. Vendl and R. A. Mariman
of North American Aviation, Inc.
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